

Nanoparticle Enables Light-Activated Ovarian Cancer Detection and Therapy

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By combining a compound produced by the plant St. John's wort with polymeric nanoparticles, researchers at the University of Geneva in Switzerland have developed a promising method for treating ovarian tumors using light. Perhaps more importantly, this nanoscale construct may also enable surgeons to detect the microscopic metastatic tumors that often remain after surgery but lead to cancer recurring years after initial therapy.

This work has been published in the *International Journal of Pharmaceutics*.

Florence Delie, Pharm. D., Ph.D., and her colleagues set out to create a powerful photosensitizer that would kill cancer cells when irradiated with light. Photosensitizers are the active agent in photodynamic therapy, which is used currently to treat or relieve the symptoms of esophageal cancer and non-small cell lung cancer. The Swiss researchers chose the compound hypericin, isolated from St. John's wort, because it can function as both a photosensitizer and a fluorescent marker that they hoped might illuminate microscopic metastatic tumors.

The investigators studied hypericin encapsulation in several polymers before settling on poly(lactic acid) as the nanoparticle material that produced the best photosensitizing properties. Studies with the resulting nanoparticle-hypericin formulation showed that this combination was more effective than hypericin itself at killing ovarian cancer cells. Indeed, the researchers note that their data suggest that the nanoparticles

not only improve cellular uptake of the photosensitizer but also deliver more hypericin to therapeutically useful sites within cells.

Following their demonstration that nanoparticle formulations of hypericin have the potential to kill ovarian cancer cells, the researchers then showed that they could detect hypericin inside cells using fluorescence microscopy. This finding suggests that surgeons may be able to use nanoparticle-delivered hypericin to find micrometastatic lesions while performing surgery to remove the primary ovarian tumor.

This work is detailed in a paper titled, “Hypericin-loaded nanoparticles for the photodynamic treatment of ovarian cancer.” This paper was published online in advance of print publication. An abstract of this paper is not yet available, but [information on this paper](#) is available at the journal’s website.

Source: National Cancer Institute

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